NON-PUBLIC?: N
ACCESSION #: 9204130219
LICENSEE EVENT REPORT (LER)

FACILITY NAME: RIVER BEND STATION PAGE: 1 OF 7

DOCKET NUMBER: 05000458

TITLE: REACTOR SCRAM CAUSED BY A GENERATOR TRIP DUE TO HIGH WINDS
CAUSING TRANSFORMER DAMAGE
EVENT DATE: 03/05/92 LER #: 92-005-00 REPORT DATE: 04/06/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: L.A. ENGLAND, DIRECTOR - NUCLEAR TELEPHONE: (504) 381-4145 LICENSING

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

At 02:03 on March 5, 1992 with the unit operating at 100 % power, (Operational Condition 1), a reactor scram occurred due to TCV fast closure. This was caused by a generator trip due to a C phase-to-ground fault of approximately 5 cycles on the 230KV transmission line from the main generator step up transformers to the Fancy Point switchyard. This ground occurred as a result of high winds which blew sheet metal siding loose from the southeast corner of the Turbine Building causing it to land on the energized components and damage the No. 2 main generator step up transformer high side disconnect switch.

Upon receiving a report of the extent of the damage, the Shift Supervisor declared a Notification of Unusual Event (NOUE) at 03:50. The NOUE was terminated at 04:23. All safety-related systems functioned as designed

in response to the transient. This report is submitted pursuant to 10CFR50.73(a)(2)(iv) to document the reactor scram.

The root cause of this event was high winds during a thunderstorm causing damage to the plant turbine building resulting in a phase-to-ground fault. This led to a generator trip and subsequent reactor scram, per design. The reactor scram occurred as designed. All safety systems functioned per design to place the plant in a safe shutdown condition. In addition, GSU has concluded that the radiological implications of insulation being blown out of the building walls are bounded by 10CFR20 Appendix C limits.

END OF ABSTRACT

REPORTED CONDITION

At 02:03 on March 5, 1992 with the unit operating at 100% power, (Operational Condition 1), a scram occurred due to TCV fast closure. This was caused by a generator trip due to a C phase-to-ground fault of approximately 5 cycles on the 230KV transmission line from the main generator up transformers to the Fancy Point switchyard. This ground occurred as a result of high winds which blew sheet metal siding loose from the southeast corner of the Turbine Building causing it to land on energized components and damage the No. 2 main generator step up transformer high side disconnect switch. Data from the River Bend meteorological tower retrieved on the next shift indicated that wind was gusting up to 75 MPH at the approximate time of the event.

Upon receiving a report of the extent of the damage, the Shift Supervisor declared a Notification Unusual Event (NOUE) at 03:50. The NOUE was terminated at 04:23. All safety-related system functioned as designed in response to the transient. This report is submitted pursuant 10CFR50.73W(2)(iv) to document the reactor scram.

At the time of the event, GSU was only 10 days away from the scheduled start date for the fourth refueling outage (RF-4). After evaluating the extent of the damage and time required to make adequate repairs to safely restart, the decision was made to enter the refueling outage rather than attempt to restart the plant.

INVESTIGATION

An inspection of the Turbine Building damage revealed that a section of the sheet metal sidingapproximately 65 feet wide by 42 feet high was torn

from the southeast corner of the building. This siding is designed such that its attachments to building structural steel will release at wind pres
exceeding 70 pounds per square foot (PSF). This is to protect the building steel from damage. The siding is also designed to stay intact at wind pressures corresponding to the design 100 year wind of 100 MPH measured at 30 feet above the ground.

A complete walkdown of the Turbine Building was performed by the River Bend Station (RBS) Design Engineering Department. In addition to the obvious damage to the southeast corner of the building inner siding panels on the southwest corner of the building were also found to be loose as well as flashing on the southwest corner of the building. Additional exterior siding panels were found loose on the south wall of the Turbine Building. No structural damage to the building steel or damage to plant equipment within the turbine building was found.

During the subsequent shift, data from chart recorders at the River Bend meteorological tower revealed that wind gusts up to approximately 75 MPH were occurring at the approximate time of the event. Note that the meteorological tower is located approximately 2800 feet west of the reactor containment (which is adjacent to the turbine building). Therefore, it is possible that higher wind velocities existed near Turbine Building. Based on the review of the damage by RBS Design Engineering and the

meteorological tower data, it appears that the siding performed as intended by releasing due to high pressure loading from strong winds.

The sheet metal siding which came loose from the turbine building was dropped onto and scattered around the area of the main generator step-up transformers. Although the exact sequence cannot be determined, it appears that a portion of the siding landed on one or more energized components (i.e. the step-up transformer leads, the 230KV transmission line or the transformer disconnect switch). Additionally, the high side disconnect switch (1YWC-21215) for the no. 2 main generator step up transformer (1MTX-XM2) was broken loose from its supports either as a result of the winds or from the force of the sheet metal siding striking it.

Visual inspection of the main generator step-up transformer 1MTX-XM2 revealed that the leads from the 230KV disconnect switch (1YWC-21215) to the high side transformer bushings were knocked off. In the process the leads to the A and C phase lightning arrestors also detached. Minor

damage existed to one transformer high side bushing and low side neutral bushing as well as the pressure relief valve, air breather piping, and A and C phase secondary bus housing. All three phases of the high side disconnect switch (1YWC-21215) were damaged. Four inspection covers on the isophase bus duct were dented and some had their retaining straps broken off. The A phase duct near the 1MTX-XM2 transformer was dented.

A visual inspection of the No. 1 main generator step-up transformer, 1MTX-XM1 revealed no indications of damage.

A fiber optic communications cable was severed. This cable was attached to the 230KV transmission line dead end support structure and connects the plant to the Fancy Point switchyard. The cable is used for tone relaying of the transmission lines and other unrelated communications such as interfacing with computers at GSU corporate headquarters. The relaying which communicates via the fiber optic cable is redundant to two other relay channels which communicate via pilot wires which are underground and were not affected by the storm. With the exception of the tone relaying system carried over the damaged fiber optic cable, all relaying operated properly to clear the fault.

The damage to the southeast wall of the Turbine Building as described above resulted in approximately 2730 square feet of 1.5 inch thick fiberglass insulation and other debris being scattered onto the buildings and grounds within the plant protected area and into the parking lots, roadways and grounds outside and north of the protected area. Initial gamma isotopic analyses of the insulation indicated trace amounts of fission products and Cobalt 60. Surveys were performed approximately one hour after the event as soon as weather permitted. These surveys indicated 1000 to 4000 disintegrations per minute per probe of fixed beta-gamma contamination on some of the insulation and siding.

Actions taken to control the spread of the contaminated insulation and assess the spread of the radioactivity were as follows:

1. Samples of runoff water, into and from the storm sewer collection system and from the Unit 2 excavation were collected and gamma isotopic analyses were performed. No radioactivity other than natural background levels was detected.

2. Vehicle access to the industrial area of the plant was secured and nonessential personnel were sent home and/or not allowed on site for the day. Vehicles leaving the site were inspected for insulation and any insulation found was removed and monitored with a pancake

G-M detector. Insulation with detectable radioactivity was found on two vehicles from the lower parking lots. The insulation was removed and the vehicles surveyed and found free of contamination. The vehicles of those personnel returning to work on the afternoon and evening of March 5, 1992 were inspected and no radioactive contamination was found.

3. A task force of personnel was assembled to retrieve the insulation. Collection and containment of the insulation began at approximately 10:00 on March 5, 1992. The upper parking lots were cleared of insulation by the evening of March 5, 1992. The entire area outside of the protected area fence was free of insulation by the morning of March 7, 1992. This was verified by a walkdown of the area and by aerial observation. The protected area was cleared of insulation by the afternoon of March 8, 1992. Followup surveys of the protected area revealed no detectable radioactive contamination.

It was estimated, based on amounts recovered, that approximately 10% of the total amount of insulation removed from the turbine building was carried outside the protected area fence. An assessment of the radioactive contamination of the insulation indicates that the amount of radioactivity carried outside the protected area fence was less than the 10CFR20 Appendix C limits for the respective isotopes based on amounts recovered. The assessment of radioactive contamination also shows that the total amount of radioactivity of each isotope contained in the entire 2730 square feet of insulation, with the exception of I-133, does not exceed the 10CFR20 Appendix C limits. The total I-133 activity was 1.09 microCuries (uCi). The Appendix C limit for this isotope is 1 uCi.

Samples of the soil taken from the protected area grounds at locations under the rain soaked insulation showed no presence of fission products and only trace amounts of Cobalt 60 (Co-60). An isotopic analysis of insulation collected from outside the protected area showed fission product concentrations at approximately the same magnitude as samples of insulation taken from undamaged portions of the turbine building wall.

Although no radioactivity was detected in runoff water, a sample of sediment from the east creek taken on the morning of March 6, 1992 contained approximately 12 pico-curies per kilogram of Co-60. The east creek carries the majority of the runoff water from the east side of the protected area and is

sampled monthly by the RBS Environmental Services Group for the presence of radionuclides. A followup sample taken on March 9 showed no

detectable Co-60 activity. It appears from these sample results that the fission product activity is relatively fixed within the insulation while the Co-60 activity in the removed insulation was washed out by the rain and transported in the east creek effluent. The total calculated activity available of Co-60 in the 2730 square feet of insulation was 0.129 uCi. This is approximately 13 % of the 10 CFR 20 Appendix C limit of 1 uCi.

The source of the radioactivity found in the insulation is internal mixing of turbine building air into the annulus area of the turbine building outer wall. The insulation acts as a filter, removing and concentrating contaminants. Turbine building air apparently enters and exits the wall through gaps in the inner wall located at the junctions of the inner wall panels. Inspection of the damaged wall reveals accumulations of dust at the panel junctions. Dustborne contaminants such as Co-60 are concentrated at the points of air entry by mechanical filtration. Samples of insulation from other parts of the turbine building wall indicate that fission gasses and their daughters are more uniformly distributed throughout the insulation. Although circulation of air within the wall occurs, the turbine building is maintained at a negative pressure relative to the outside atmosphere and there is no unmonitored release of radioactivity.

GSU has concluded that the amount of radioactivity released to the area outside the protected area posed no threat to the public or plant personnel. Based on conservative assumptions, the maximum amount of radioactivity that could have been released outside the protected area due to Co-60 was 0.129 microCuries.

The plant response to the transient was generally as would be expected with a few exceptions which will be discussed below. The protective relaying operated properly with the exception of the tone relaying which was disabled when the fiber optic cable was damaged as discussed previously. Total time to detect and clear the fault (i.e. trip the generator) was 5 cycles which is typical for this type fault and equipment. A turbine control valve (TCV) fast closure resulting in a reactor scram occurred properly - The resulting pressure transient in the reactor vessel caused all five low-low set safety relief valves (SRVs) to lift. This was proper operation as the Emergency Response Information System (ERIS) computer system indicates a maximum reactor pressure of 1113 PSIG. One of the low-low set SRVs (F051D) lifts at 1103 PSIG and the other four lift at 1113 PSIG. After their initial opening, the SRVs reclosed properly. Reactor pressure remained below the low-low set SRV setpoints so that they did not reopen.

Initial reports indicated a possible discrepancy between the time of the

scram initiation and the time at which control rod motion was first detected which seemed to indicate that the control rods began to move prior to the initiation of the scram signal from the reactor protection system. This apparent discrepancy was based on the process computer alarm printer in the main control room which listed the control rod motion prior to the scram. It should be understood that this is not a sequence of events log. Due to the method in which the points are sequentially scanned, it is not uncommon for events which occur very close together in time to be reversed in their order on the alarm printout due to the

dependency on the point in the sequence at which the computer is scanning at the times of the occurrences. A scram time program from the ERIS TRA computer system indicates that the actual scram time was 02:03:15.213 while rod motion was first detected at 02:03:15.216. All scram times were positive time values and acceptable.

The ERIS computer indicates minimum vessel water level was approximately +3". All actuations which should have occurred at Level 3 (+9.7") were verified by the Operations crew to have occurred properly. Maximum vessel level exceeded Level 8 (+51").

ROOT CAUSE

The root cause of this event was high winds during a thunderstorm causing damage to the plant turbine building resulting in a phase-to-ground fault. This led to a generator trip and subsequent reactor scram, per design.

CORRECTIVE ACTION

All damage to the 1MTX-XM2 transformer will be reworked per MWO 153226 prior to the plant restarting from RF-4. The high side disconnect switch 1YWC-21215 will be reworked or replaced. The isophase bus duct covers will also be reworked and the dent evaluated and dispositioned during RF-4. A temporary splice was made on the fiber optic cable and testing was conducted to ensure operability of the relaying circuits. A final rework or replacement of this cable will be made during RF-4.

Oil samples of both main generator step-up transformers, and all normal station service and preferred station service transformers were taken and analyzed to ensure no internal damage had occurred to the transformers. All results were satisfactory. Megger testing and Doble testing was performed on the main generator step up transformers and the isophase bus

with satisfactory results. The normal station service transformers were Doble tested and found to be satisfactory. The preferred station service transformers will be tested prior to startup from RF-4. Finally, as a precaution a megger test was performed on the main generator and this was found to be acceptable.

The Turbine Building wall was temporarily replaced with plywood in accordance with Prompt Modification Request (PMR) 92-0007. This ensures that equipment inside the building is protected and that a negative pressure can be maintained inside the Turbine Building. The wall will be reworked to original specifications prior to startup from RF-4.

SAFETY ASSESSMENT

The reactor scram occurred as designed. All safety systems functioned per design to place the plant in a safe shutdown condition.

As stated previously, the radiological implications of the Co-60 in the insulation are bounded by the 10CFR20 Appendix C limits. The 1-133 was fixed contamination in the insulation and none of it was detected in either soil samples within the protected area or in the sediment of the east creek. In addition, it was estimated that only about 10 percent of the total amount of insulation was carried outside the protected area fence and was subsequently retrieved. Therefore, GSU concludes that the quantity of radioactive material released outside the protected area was bounded by 10CFR20 Appendix C limits.

GULF STATES UTILITIES COMPANY

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AREA CODE 504 635-6094 346-8651

April 6,, 1992
RBG-36706
File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Please find enclosed Licensee Event Report No. 92-005 for River Bend Station - Unit 1. This report is submitted pursuant 10CFR50.73.

Sincerely,

W.H. Odell
Manager - Oversight
River Bend Nuclear Group

LAE/PDG/SRR/DCH/REC/kvm

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